

CERTIFICATION

SDG No: JC15796R Laboratory: Accutest, New Jersey
Site: BMSMC, Building 5 Area Matrix: Groundwater
SM04.00.06
Humacao, PR

SUMMARY: Groundwater samples (Table 1) were collected on the BMSMC facility – Building 5 area. The BMSMC facility is located in Humacao, PR. Samples were taken March 7, 2016 and were analyzed in Accutest Laboratory of Dayton, New Jersey that reported the data under SDG No.: JC15796R. Results were validated using the latest guidelines (July, 2015) of the EPA Hazardous Waste Support Section. The analyses performed are shown in Table 1. Individual data review worksheets are enclosed for each target analyte group. Data sample organic data samples summary form shows for analytes results that were qualified.

In summary the results are valid and can be used for decision taking purposes.

Table 1. Samples analyzed and analysis performed

| SAMPLE ID | SAMPLE DESCRIPTION | ANALYSIS PERFORMED |
|---------------|--------------------|---------------------|
| JC15796-1R | S-29R | TCL LIST PESTICIDES |
| JC15796-1RMS | S-9R2MS | TCL LIST PESTICIDES |
| JC15796-1RMSD | S-29RMSD | TCL LIST PESTICIDES |
| JC15796-2R | S-31R(2) | TCL LIST PESTICIDES |
| JC15796-3R | EB030716 | TCL LIST PESTICIDES |

Reviewer Name: Rafael Infante
Chemist License 1888

Signature:



Date:

May 5, 2016



SGS Accutest

Report of Analysis

Page 1 of 1

| | | | |
|-------------------|----------------------------|-----------------|----------|
| Client Sample ID: | S-29R | Date Sampled: | 03/07/16 |
| Lab Sample ID: | JC15796-1R | Date Received: | 03/09/16 |
| Matrix: | AQ - Ground Water | Percent Solids: | n/a |
| Method: | SW846 8081B SW846 3510C | | |
| Project: | BMSMC, Building 5 Area, PR | | |

| Run # | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|--------|------------|----|----------|----|-----------|------------|------------------|
| Run #1 | 4G66284R.D | 1 | 03/20/16 | BP | 03/13/16 | OP92024 | G4G1744 |
| Run #2 | | | | | | | |

| Run # | Initial Volume | Final Volume |
|--------|----------------|--------------|
| Run #1 | 1000 ml | 10.0 ml |
| Run #2 | | |

Pesticide TCL List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|------------|---------------------|--------|-------|--------|-------|---|
| 309-00-2 | Aldrin | ND | 0.010 | 0.0060 | ug/l | |
| 319-84-6 | alpha-BHC | ND | 0.010 | 0.0060 | ug/l | |
| 319-85-7 | beta-BHC | ND | 0.010 | 0.0057 | ug/l | |
| 319-86-8 | delta-BHC | ND | 0.010 | 0.0046 | ug/l | |
| 58-89-9 | gamma-BHC (Lindane) | ND | 0.010 | 0.0028 | ug/l | |
| 5103-71-9 | alpha-Chlordane | ND | 0.010 | 0.0046 | ug/l | |
| 5103-74-2 | gamma-Chlordane | ND | 0.010 | 0.0046 | ug/l | |
| 60-57-1 | Dieldrin | ND | 0.010 | 0.0036 | ug/l | |
| 72-54-8 | 4,4'-DDD | ND | 0.010 | 0.0038 | ug/l | |
| 72-55-9 | 4,4'-DDE | ND | 0.010 | 0.0062 | ug/l | |
| 50-29-3 | 4,4'-DDT | ND | 0.010 | 0.0050 | ug/l | |
| 72-20-8 | Endrin | ND | 0.010 | 0.0050 | ug/l | |
| 1031-07-8 | Endosulfan sulfate | ND | 0.010 | 0.0053 | ug/l | |
| 7421-93-4 | Endrin aldehyde | ND | 0.010 | 0.0051 | ug/l | |
| 53494-70-5 | Endrin ketone | ND | 0.010 | 0.0051 | ug/l | |
| 959-98-8 | Endosulfan-I | ND | 0.010 | 0.0050 | ug/l | |
| 33213-65-9 | Endosulfan-II | ND | 0.010 | 0.0043 | ug/l | |
| 76-44-8 | Heptachlor | ND | 0.010 | 0.0038 | ug/l | |
| 1024-57-3 | Heptachlor epoxide | ND | 0.010 | 0.0065 | ug/l | |
| 72-43-5 | Methoxychlor | ND | 0.020 | 0.0057 | ug/l | |
| 8001-35-2 | Toxaphene | ND | 0.25 | 0.18 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|-----------|----------------------|-------------------|--------|---------|
| 877-09-8 | Tetrachloro-m-xylene | 123% | | 26-132% |
| 877-09-8 | Tetrachloro-m-xylene | 119% | | 26-132% |
| 2051-24-3 | Decachlorobiphenyl | 170% ^a | | 10-118% |
| 2051-24-3 | Decachlorobiphenyl | 156% ^a | | 10-118% |

(a) High percent recoveries and no positive found in the sample.



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

SGS Accutest

Report of Analysis

Page 1 of 1

Client Sample ID: S-31R(2)
 Lab Sample ID: JC15796-2R
 Matrix: AQ - Ground Water
 Method: SW846 8081B SW846 3510C
 Project: BSMC, Building 5 Area, PR

Date Sampled: 03/07/16
 Date Received: 03/09/16
 Percent Solids: n/a

| Run # | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|--------|------------|----|----------|----|-----------|------------|------------------|
| Run #1 | 4G66285R.D | 1 | 03/20/16 | BP | 03/13/16 | OP92024 | G4G1744 |
| Run #2 | | | | | | | |

| Run # | Initial Volume | Final Volume |
|--------|----------------|--------------|
| Run #1 | 1000 ml | 10.0 ml |
| Run #2 | | |

Pesticide TCL List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|------------|---------------------|--------|-------|--------|-------|---|
| 309-00-2 | Aldrin | ND | 0.010 | 0.0060 | ug/l | |
| 319-84-6 | alpha-BHC | ND | 0.010 | 0.0060 | ug/l | |
| 319-85-7 | beta-BHC | ND | 0.010 | 0.0057 | ug/l | |
| 319-86-8 | delta-BHC | ND | 0.010 | 0.0046 | ug/l | |
| 58-89-9 | gamma-BHC (Lindane) | ND | 0.010 | 0.0028 | ug/l | |
| 5103-71-9 | alpha-Chlordane | ND | 0.010 | 0.0046 | ug/l | |
| 5103-74-2 | gamma-Chlordane | ND | 0.010 | 0.0046 | ug/l | |
| 60-57-1 | Dieldrin | ND | 0.010 | 0.0036 | ug/l | |
| 72-54-8 | 4,4'-DDD | ND | 0.010 | 0.0038 | ug/l | |
| 72-55-9 | 4,4'-DDE | ND | 0.010 | 0.0062 | ug/l | |
| 50-29-3 | 4,4'-DDT | ND | 0.010 | 0.0050 | ug/l | |
| 72-20-8 | Endrin | ND | 0.010 | 0.0050 | ug/l | |
| 1031-07-8 | Endosulfan sulfate | ND | 0.010 | 0.0053 | ug/l | |
| 7421-93-4 | Endrin aldehyde | ND | 0.010 | 0.0051 | ug/l | |
| 53494-70-5 | Endrin ketone | ND | 0.010 | 0.0051 | ug/l | |
| 959-98-8 | Endosulfan-I | ND | 0.010 | 0.0050 | ug/l | |
| 33213-65-9 | Endosulfan-II | ND | 0.010 | 0.0043 | ug/l | |
| 76-44-8 | Heptachlor | ND | 0.010 | 0.0038 | ug/l | |
| 1024-57-3 | Heptachlor epoxide | ND | 0.010 | 0.0065 | ug/l | |
| 72-43-5 | Methoxychlor | ND | 0.020 | 0.0057 | ug/l | |
| 8001-35-2 | Toxaphene | ND | 0.25 | 0.18 | ug/l | |

| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits |
|-----------|----------------------|-------------------|--------|---------|
| 877-09-8 | Tetrachloro-m-xylene | 92% | | 26-132% |
| 877-09-8 | Tetrachloro-m-xylene | 105% | | 26-132% |
| 2051-24-3 | Decachlorobiphenyl | 115% | | 10-118% |
| 2051-24-3 | Decachlorobiphenyl | 122% ^a | | 10-118% |

(a) High percent recoveries and no positive found in the sample.



ND = Not detected MDL = Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

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Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: JC15796R

Account: AMANYWP Anderson, Mulholland & Associates

Project: BMSMC, Building 5 Area, PR

| Sample | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
|-------------|------------|----|----------|----|-----------|------------|------------------|
| OP92024-MS | 4G66282.D | 1 | 03/20/16 | BP | 03/13/16 | OP92024 | G4G1744 |
| OP92024-MSD | 4G66283.D | 1 | 03/20/16 | BP | 03/13/16 | OP92024 | G4G1744 |
| JC15796-1R | 4G66284R.D | 1 | 03/20/16 | BP | 03/13/16 | OP92024 | G4G1744 |
| JC15796-1 | 4G66284.D | 1 | 03/20/16 | BP | 03/13/16 | OP92024 | G4G1744 |

The QC reported here applies to the following samples:

Method: SW846 8081B

JC15796-1R, JC15796-2R, JC15796-3R

| CAS No. | Compound | JC15796-1R Spike ug/l | MS ug/l | MS % | Spike ug/l | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|------------|---------------------|-----------------------|---------|------|------------|----------|-------|-----|----------------|
| 309-00-2 | Aldrin | ND | 0.25 | 0.31 | 124 | 0.25 | 0.35 | 12 | 37-159/40 |
| 319-84-6 | alpha-BHC | ND | 0.25 | 0.34 | 136 | 0.25 | 0.39 | 14 | 37-164/37 |
| 319-85-7 | beta-BHC | ND | 0.25 | 0.31 | 124 | 0.25 | 0.34 | 9 | 46-151/36 |
| 319-86-8 | delta-BHC | ND | 0.25 | 0.34 | 136 | 0.25 | 0.39 | 14 | 32-168/36 |
| 58-89-9 | gamma-BHC (Lindane) | ND | 0.25 | 0.33 | 132 | 0.25 | 0.38 | 14 | 44-160/37 |
| 5103-71-9 | alpha-Chlordane | ND | 0.25 | 0.38 | 152* a | 0.25 | 0.44 | 15 | 38-160/35 |
| 5103-74-2 | gamma-Chlordane | ND | 0.25 | 0.40 | 160 | 0.25 | 0.45 | 12 | 39-157/37 |
| 60-57-1 | Dieldrin | ND | 0.25 | 0.35 | 140 | 0.25 | 0.41 | 16 | 42-161/36 |
| 72-54-8 | 4,4'-DDD | ND | 0.25 | 0.35 | 140 | 0.25 | 0.41 | 16 | 40-161/36 |
| 72-55-9 | 4,4'-DDE | ND | 0.25 | 0.35 | 140 | 0.25 | 0.41 | 16 | 34-158/36 |
| 50-29-3 | 4,4'-DDT | ND | 0.25 | 0.41 | 164* a | 0.25 | 0.48 | 16 | 41-173/33 |
| 72-20-8 | Endrin | ND | 0.25 | 0.40 | 164* a | 0.25 | 0.47 | 16 | 44-166/35 |
| 1031-07-8 | Endosulfan sulfate | ND | 0.25 | 0.43 | 172* a | 0.25 | 0.50 | 15 | 46-161/36 |
| 7421-93-4 | Endrin aldehyde | ND | 0.25 | 0.37 | 148* a | 0.25 | 0.43 | 15 | 34-149/36 |
| 53494-70-5 | Endrin ketone | ND | 0.25 | 0.38 | 152* a | 0.25 | 0.44 | 15 | 44-157/36 |
| 959-98-8 | Endosulfan-I | ND | 0.25 | 0.35 | 140* a | 0.25 | 0.40 | 13 | 43-154/35 |
| 33213-65-9 | Endosulfan-II | ND | 0.25 | 0.37 | 148* a | 0.25 | 0.43 | 15 | 40-162/35 |
| 76-44-8 | Heptachlor | ND | 0.25 | 0.32 | 128 | 0.25 | 0.37 | 14 | 33-153/37 |
| 1024-57-3 | Heptachlor epoxide | ND | 0.25 | 0.36 | 144* a | 0.25 | 0.43 | 18 | 45-154/37 |
| 72-43-5 | Methoxychlor | ND | 0.25 | 0.49 | 196* a | 0.25 | 0.58 | 17 | 48-169/32 |
| 8001-35-2 | Toxaphene | ND | ND | ND | ND | ND | ND | nc | 50-150/30 |

| CAS No. | Surrogate Recoveries | MS | MSD | JC15796-1R | JC15796-1 | Limits |
|-----------|----------------------|---------|---------|------------|-----------|---------|
| 877-09-8 | Tetrachloro-m-xylene | 106% | 126%* a | 123% | 123% | 26-132% |
| 877-09-8 | Tetrachloro-m-xylene | 103% | 123%* a | 119% | 119% | 26-132% |
| 2051-24-3 | Decachlorobiphenyl | 147%* a | 180%* a | 170%* b | 170%* b | 10-118% |
| 2051-24-3 | Decachlorobiphenyl | 138%* a | 167%* a | 156%* b | 156%* b | 10-118% |

(a) Outside the QC limits.

(b) High percent recoveries and no positive found in the sample.



* = Outside of Control Limits.

6W
LED
WTO

CHAIN OF CUSTODY

Fresh Ponds Corporate Village, Building B
2235 Route 138, Dayton, NJ 08810
732-329-0200 FAX: 732-329-3499/3480

FACID 8012 1535.70

Account Job #: JC15796

Account Quote #:

| Client Information | | | | Facility Information | | | | Analytical Information | | | | | | | | | | | | | | | |
|--|--|------------|-------|--|--|--------|--|---|--|--------------|--|--|--|--------------------|--|----|--|--|--|--|--|--|--|
| Anderson Mulholland & Associates | | | | Anderson Mulholland and Associates Inc. | | | | | | | | | | | | | | | | | | | |
| Name | | | | Project Name | | | | | | | | | | | | | | | | | | | |
| 2700 Westchester Avenue | | | | | | | | | | | | | | | | | | | | | | | |
| Address | | | | Location | | | | | | | | | | | | | | | | | | | |
| Purchase NY 10577 | | | | | | | | | | | | | | | | | | | | | | | |
| City State Zip | | | | Project/PO # | | | | | | | | | | | | | | | | | | | |
| Terry Taylor | | | | BMS: Building 8 Area | | | | | | | | | | | | | | | | | | | |
| Send Report to: | | | | FAX #: | | | | | | | | | | | | | | | | | | | |
| Phone #: 914-251-0400 | | | | 914-251-1288 | | | | | | | | | | | | | | | | | | | |
| Field ID / Point of Collection | | Collection | | Sampled By | | Matrix | | # of bottles | | Preservation | | | | | | | | | | | | | |
| | | Date | Time | | | | | | | | | | | | | | | | | | | | |
| 1 S-2AR | | 3/7/16 | 11:14 | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| S-29R MS | | | 11:25 | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| S-29R MSD | | | 11:35 | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| 2 S-31R(2) | | | 11:35 | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| 3 EB030716 | | 3/7/16 | 14:28 | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| | | | 14:51 | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| | | | | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| | | | | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| | | | | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| | | | | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| | | | | NMR | | GW | | 10 | | X | | | | | | | | | | | | | |
| 4 TB030716 | | 3/7/16 | 14:28 | NMR | | H | | 4 | | X | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | INITIAL ASSESSMENT | | 1A | | | | | | | |
| | | | | | | | | | | | | | | LABEL VERIFICATION | | 1A | | | | | | | |
| Turnaround Information | | | | Data Deliverable Information | | | | Comments / Remarks | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> 21 Day Standard <input type="checkbox"/> 14 Day <input type="checkbox"/> 7 Days EMERGENCY <input type="checkbox"/> Other (Days) RUSH TAT is for FAX data unless previously approved. | | | | Approved By: _____ <input type="checkbox"/> NJ Reduced <input checked="" type="checkbox"/> NJ Full <input type="checkbox"/> FULL CLP <input type="checkbox"/> Data Deliverable <input type="checkbox"/> Other (Specify) | | | | <input type="checkbox"/> Commercial "A" <input type="checkbox"/> Commercial "B" <input type="checkbox"/> ASP Category B <input type="checkbox"/> State Forms | | | | Federal Express ID # 8012 1535 5170 Lab Trip Blank Date 3/5/16 Time 1000 SVOC Analysis by Method 8270D SIM for 1,4 Dioxane and Naphthalene only. | | | | | | | | | | | |
| Sample Custody must be documented below each time sample change possession, including courier delivery. | | | | | | | | | | | | | | | | | | | | | | | |
| Received By: _____ | | | | Received By: _____ | | | | Received By: _____ | | | | Received By: _____ | | | | | | | | | | | |
| Date/Time: 3/7/16 10:43 | | | | Date/Time: 3/7/16 10:43 | | | | Date/Time: 3/7/16 10:43 | | | | Date/Time: 3/7/16 10:43 | | | | | | | | | | | |
| Received By: _____ | | | | Received By: _____ | | | | Received By: _____ | | | | Received By: _____ | | | | | | | | | | | |
| Date/Time: _____ | | | | Date/Time: _____ | | | | Date/Time: _____ | | | | Date/Time: _____ | | | | | | | | | | | |
| Received By: _____ | | | | Received By: _____ | | | | Received By: _____ | | | | Received By: _____ | | | | | | | | | | | |
| Date/Time: _____ | | | | Date/Time: _____ | | | | Date/Time: _____ | | | | Date/Time: _____ | | | | | | | | | | | |
| Received By: _____ | | | | Received By: _____ | | | | Received By: _____ | | | | Received By: _____ | | | | | | | | | | | |
| Date/Time: _____ | | | | Date/Time: _____ | | | | Date/Time: _____ | | | | Date/Time: _____ | | | | | | | | | | | |

33, 40, 3.9 & IP

JC15796R: Chain of Custody

Page 1 of 4



EXECUTIVE NARRATIVE

SDG No: **JC15796R** Laboratory: **Accutest, New Jersey**
Analysis: **SW846-8081B** Number of Samples: **5**
Location: **BMSMC, Building 5 Area**
Humacao, PR

SUMMARY: Five (5) groundwater samples were analyzed for selected pesticides following method SW846-8081B. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence *Hazardous Waste Support Section SOP No. HW-36A, Revision 0, June, 2015. SOM02.2. Pesticide Data Validation*. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

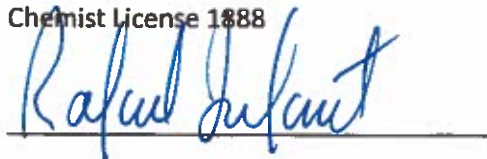
Critical issues: None
Major: None
Minor: 1. Several surrogate recoveries (tetrachloro-m-xylene and decachlorobiphenyl) outside laboratory control limits in sample JC15796-1R; -2R; Blank Spike; JC15796-1RMS and -1RMSD. No action taken, surrogate recoveries within control limits in at least one of the columns except for the Blank Spike sample (QC sample).
2. Several analytes MS/MSD recoveries outside the laboratory/guidance validation document criteria. Percent recoveries high and analytes not detected in the sample. No action taken, professional judgment.
3. Florisil and GPC cartridge performance check data not included in data package. No action taken.

Critical findings: None
Major findings: None
Minor findings: None

COMMENTS: Results are valid and can be used for decision making purposes.

Reviewers Name: Rafael Infante
Chemist License 1888

Signature:



Date: May 5, 2016

SAMPLE ORGANIC DATA SAMPLE SUMMARY

Sample ID: JC15796-1R

Sample location: BMSMC Building 5 Area

Sampling date: 7-Mar-16

Matrix: Groundwater

METHOD: 8081B

| Analyte Name | Result | Units | Dilution Factor | Lab Flag | Validation | Reportable |
|---------------------|--------|-------|-----------------|----------|------------|------------|
| Aldrin | 0.010 | ug/L | 1 | - | U | Yes |
| alpha-BHC | 0.010 | ug/L | 1 | - | U | Yes |
| beta-BHC | 0.010 | ug/L | 1 | - | U | Yes |
| delta-BHC | 0.010 | ug/L | 1 | - | U | Yes |
| gamma-BHC (Lindane) | 0.010 | ug/L | 1 | - | U | Yes |
| alpha-Chlordane | 0.010 | ug/L | 1 | - | U | Yes |
| gamma-Chlordane | 0.010 | ug/L | 1 | - | U | Yes |
| Dieldrin | 0.010 | ug/L | 1 | - | U | Yes |
| 4,4'-DDD | 0.010 | ug/L | 1 | - | U | Yes |
| 4,4'-DDE | 0.010 | ug/L | 1 | - | U | Yes |
| 4,4'-DDT | 0.010 | ug/L | 1 | - | U | Yes |
| Endrin | 0.010 | ug/L | 1 | - | U | Yes |
| Endosulfan sulfate | 0.010 | ug/L | 1 | - | U | Yes |
| Endrin aldehyde | 0.010 | ug/L | 1 | - | U | Yes |
| Endrin ketone | 0.010 | ug/L | 1 | - | U | Yes |
| Endosulfan-I | 0.010 | ug/L | 1 | - | U | Yes |
| Endosulfan-II | 0.010 | ug/L | 1 | - | U | Yes |
| Heptachlor | 0.010 | ug/L | 1 | - | U | Yes |
| Heptachlor epoxide | 0.010 | ug/L | 1 | - | U | Yes |
| Methoxychlor | 0.020 | ug/L | 1 | - | U | Yes |
| Toxaphene | 0.25 | ug/L | 1 | - | U | Yes |

Sample ID: JC15796-2R
Sample location: BMSMC Building 5 Area
Sampling date: 7-Mar-16
Matrix: Groundwater

METHOD: 8081B

| Analyte Name | Result | Units | Dilution Factor | Lab Flag | Validation | Reportable |
|---------------------|--------|-------|-----------------|----------|------------|------------|
| Aldrin | 0.010 | ug/L | 1 | - | U | Yes |
| alpha-BHC | 0.010 | ug/L | 1 | - | U | Yes |
| beta-BHC | 0.010 | ug/L | 1 | - | U | Yes |
| delta-BHC | 0.010 | ug/L | 1 | - | U | Yes |
| gamma-BHC (Lindane) | 0.010 | ug/L | 1 | - | U | Yes |
| alpha-Chlordane | 0.010 | ug/L | 1 | - | U | Yes |
| gamma-Chlordane | 0.010 | ug/L | 1 | - | U | Yes |
| Dieldrin | 0.010 | ug/L | 1 | - | U | Yes |
| 4,4'-DDD | 0.010 | ug/L | 1 | - | U | Yes |
| 4,4'-DDE | 0.010 | ug/L | 1 | - | U | Yes |
| 4,4'-DDT | 0.010 | ug/L | 1 | - | U | Yes |
| Endrin | 0.010 | ug/L | 1 | - | U | Yes |
| Endosulfan sulfate | 0.010 | ug/L | 1 | - | U | Yes |
| Endrin aldehyde | 0.010 | ug/L | 1 | - | U | Yes |
| Endrin ketone | 0.010 | ug/L | 1 | - | U | Yes |
| Endosulfan-I | 0.010 | ug/L | 1 | - | U | Yes |
| Endosulfan-II | 0.010 | ug/L | 1 | - | U | Yes |
| Heptachlor | 0.010 | ug/L | 1 | - | U | Yes |
| Heptachlor epoxide | 0.010 | ug/L | 1 | - | U | Yes |
| Methoxychlor | 0.020 | ug/L | 1 | - | U | Yes |
| Toxaphene | 0.25 | ug/L | 1 | - | U | Yes |

Sample ID: JC15796-3R
Sample location: BMSMC Building 5 Area
Sampling date: 7-Mar-16
Matrix: Groundwater

METHOD: 8081B

| Analyte Name | Result | Units | Dilution Factor | Lab Flag | Validation | Reportable |
|---------------------|--------|-------|-----------------|----------|------------|------------|
| Aldrin | 0.011 | ug/L | 1 | - | U | Yes |
| alpha-BHC | 0.011 | ug/L | 1 | - | U | Yes |
| beta-BHC | 0.011 | ug/L | 1 | - | U | Yes |
| delta-BHC | 0.011 | ug/L | 1 | - | U | Yes |
| gamma-BHC (Lindane) | 0.011 | ug/L | 1 | - | U | Yes |
| alpha-Chlordane | 0.011 | ug/L | 1 | - | U | Yes |
| gamma-Chlordane | 0.011 | ug/L | 1 | - | U | Yes |
| Dieldrin | 0.011 | ug/L | 1 | - | U | Yes |
| 4,4'-DDD | 0.011 | ug/L | 1 | - | U | Yes |
| 4,4'-DDE | 0.011 | ug/L | 1 | - | U | Yes |
| 4,4'-DDT | 0.011 | ug/L | 1 | - | U | Yes |
| Endrin | 0.011 | ug/L | 1 | - | U | Yes |
| Endosulfan sulfate | 0.011 | ug/L | 1 | - | U | Yes |
| Endrin aldehyde | 0.011 | ug/L | 1 | - | U | Yes |
| Endrin ketone | 0.011 | ug/L | 1 | - | U | Yes |
| Endosulfan-I | 0.011 | ug/L | 1 | - | U | Yes |
| Endosulfan-II | 0.011 | ug/L | 1 | - | U | Yes |
| Heptachlor | 0.011 | ug/L | 1 | - | U | Yes |
| Heptachlor epoxide | 0.011 | ug/L | 1 | - | U | Yes |
| Methoxychlor | 0.022 | ug/L | 1 | - | U | Yes |
| Toxaphene | 0.28 | ug/L | 1 | - | U | Yes |

DATA REVIEW WORKSHEETS

Project/Case Number: JC15796R
 Sampling Date: March 7, 2016
 Shipping Date: March 8, 2016
 EPA Region No.: 2

REVIEW OF PESTICIDE ORGANIC PACKAGE

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence *Hazardous Waste Support Section SOP No. HW-36A, Revision 0, June, 2015. SOM02.2. Pesticide Data Validation*. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

The hardcopied (laboratory name) Accutest data package received has been reviewed and the quality control and performance data summarized. The data review for VOCs included:

Lab. Project/SDG No.: JC15796R Sample matrix: Groundwater
 No. of Samples: 5

Trip blank No.: -
 Field blank No.: -
 Equipment blank No.: JC15796-3R
 Field duplicate No.: -
 Field spikes No.: -
 QC audit samples: -

| | |
|---|---|
| <input checked="" type="checkbox"/> Data Completeness | <input checked="" type="checkbox"/> Laboratory Control Spikes |
| <input checked="" type="checkbox"/> Holding Times | <input checked="" type="checkbox"/> Field Duplicates |
| <input type="checkbox"/> N/A GC/MS Tuning | <input checked="" type="checkbox"/> Calibrations |
| <input checked="" type="checkbox"/> Internal Standard Performance | <input checked="" type="checkbox"/> Compound Identifications |
| <input checked="" type="checkbox"/> Blanks | <input checked="" type="checkbox"/> Compound Quantitation |
| <input checked="" type="checkbox"/> Surrogate Recoveries | <input checked="" type="checkbox"/> Quantitation Limits |
| <input checked="" type="checkbox"/> Matrix Spike/Matrix Spike Duplicate | |

Overall Comments: Pesticides TCL list by SW846-8081B

Definition of Qualifiers:

J- Estimated results
 U- Compound not detected
 R- Rejected data
 UJ- Estimated nondetect

Reviewer: Rafael Defaut
 Date: May 5, 2016

DATA REVIEW WORKSHEETS

DATA COMPLETENESS

MISSING INFORMATION

DATE LAB. CONTACTED

DATE RECEIVED

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below _____

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

| SAMPLE ID | DATE SAMPLED | DATE EXTRACTED/ANALYZED | ACTION |
|-----------|--------------|-------------------------|--------|
| | | | |
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Preservatives: All samples extracted and analyzed within the required criteria.

Criteria

Aqueous samples - seven (7) days from sample collection for extraction; 40 days from sample collection for analysis.

Non-aqueous samples – fourteen (14) days from sample collection for extraction; 40 days from sample collection for analysis.

Cooler temperature (Criteria: 4 ± 2 °C): 4.4°C - OK

Actions

Qualify aqueous sample results using preservation and technical holding time information as follows:

- If there is no evidence that the samples were properly preserved ($T = 4^{\circ}\text{C} \pm 2^{\circ}\text{C}$), and the samples were extracted or analyzed within the technical holding times, qualify detects as estimated (J) and non-detects as estimated (UJ).
- If there is no evidence that the samples were properly preserved ($T = 4^{\circ}\text{C} \pm 2^{\circ}\text{C}$), and the samples were extracted or analyzed outside the technical holding times, qualify detects as estimated (J) and non-detects as estimated (UJ).
- If the samples were properly preserved, and were extracted and analyzed within the technical holding times, no qualification of the data is necessary.
- If the samples were properly preserved, and were extracted or analyzed outside the technical holding times, qualify detects as estimated (J) and non-detects as estimated (UJ). Note in the Data Review Narrative that holding times were exceeded and the effect of exceeding the holding time on the resulting data.

DATA REVIEW WORKSHEETS

- e. Use professional judgment to qualify samples whose temperature upon receipt at the laboratory is either below 2 degrees centigrade or above 6 degrees centigrade.
- f. If technical holding times are grossly exceeded, use professional judgment to qualify the data.

Qualify non-aqueous sample results using preservation and technical holding time information as follows:

- a. If there is no evidence that the samples were properly preserved ($T = 4^{\circ}\text{C} \pm 2^{\circ}\text{C}$), and the samples were extracted or analyzed within the technical holding time, qualify detects as estimated (J) and non-detects as estimated (UJ).
- b. If there is no evidence that the samples were properly preserved ($T = 4^{\circ}\text{C} \pm 2^{\circ}\text{C}$), and the samples were extracted or analyzed outside the technical holding time, qualify detects as estimated (J) and non-detects as estimated (UJ).
- c. If the samples were properly preserved, and were extracted and analyzed within the technical holding time, no qualification of the data is necessary.
- d. If the samples were properly preserved, and were extracted or analyzed outside the technical holding time, qualify detects as estimated (J) and non-detects as estimated (UJ). Note in the Data Review Narrative that holding times were exceeded and the effect of exceeding the holding time on the resulting data.
- e. Use professional judgment to qualify samples whose temperature upon receipt at the laboratory is either below 2 degrees centigrade or above 6 degrees centigrade.
- f. If technical holding times are grossly exceeded, use professional judgment to qualify the data.

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met see below

GAS CHROMATOGRAPH WITH ELECTRON CAPTURE DETECTOR (GC/ECD) INSTRUMENT PERFORMANCE CHECK (SECTIONS 1 TO 5)

1. Resolution Check Mixture

Criteria

Is the resolution between two adjacent peaks in the Resolution Check Mixture C greater than or equal to 80.0% for all analytes for the primary column and greater than or equal to 50.0% for the confirmation column? Yes? or No?

Is the resolution between two adjacent peaks in the Resolution Check Mixture (A and B) greater than or equal to 60.0%? Yes? or No?

Note: If resolution criteria are not met, the quantitative results may not be accurate due to inadequate resolution. Qualitative identifications may also be questionable if coelution exists.

Action

- a. Qualify detects for target compounds that were not adequately resolved as tentatively identified (NJ).
- b. Qualify non-detected compounds as unusable (R).

2. Performance Evaluation Mixture (PEM) Resolution Criteria

Criteria

Is PEM analysis performed at the required frequency (at the end of each pesticide initial calibration sequence and every 12 hours)? Yes? or No?

Action

- a. If PEM is not performed at the required frequency, qualify all associated sample and blank results as unusable (R).

Criteria

Is PEM % Resolution < 90%? Yes? or No?

Action

- a. a. Qualify detects for target compounds that were not adequately resolved as tentatively identified (NJ).
- b. Qualify non-detected compounds as unusable (R).

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met see below

3. PEM 4,4'-DDT Breakdown

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is detected? Yes? or No?

Action

a. Qualify detects for 4,4'-DDT; detects for 4,4'-DDD; and detects for 4,4'-DDE as estimated (J)

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is not detected Yes? or No?

Action

- a. Qualify non-detects for 4,4'- DDT as unusable (R)
- b. Qualify detects for 4,4'-DDD as tentatively identified (NJ)
- c. Qualify detects for 4,4'-DDE as tentatively identified (NJ)

4. PEM Endrin Breakdown

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is detected? Yes? or No?

Action

a. Qualify detects for Endrin; detects for Endrin aldehyde; and detects for Endrin ketone as estimated (J)

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is not detected Yes? or No?

Action

- a. Qualify non-detects for Endrin as unusable (R)
- b. Qualify detects for Endrin aldehyde as tentatively identified (NJ)
- c. Qualify detects for Endrin ketone as tentatively identified (NJ)

All criteria were met X
Criteria were not met see below

5. Mid-point Individual Standard Mixture Resolution -

Criteria

Is the resolution between two adjacent peaks in the Resolution Check Mixture C greater than or equal to 80.0% for all analytes for the primary column and greater than or equal to 50.0% for the confirmation column? Yes? or No?

Is the resolution between two adjacent peaks in the Resolution Check Mixture (A and B) greater than or equal to 90.0%? Yes? or No?

Note: If resolution criteria are not met, the quantitative results may not be accurate due to inadequate resolution. Qualitative identifications may also be questionable if coelution exists.

Action

- a. Qualify detects for target compounds that were not adequately resolved as tentatively identified (NJ).
- b. Qualify non-detected compounds as unusable (R).

Criteria

Is mid-point individual standard mixture analysis performed at the required frequency (every 12 hours)? Yes? or No?

Action

- a. If the mid-point individual standard mixture analysis is not performed at the required frequency, qualify all associated sample and blank results as unusable (R).

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

Date of initial calibration: 03/18/16
 Dates of continuing calibration: 03/18/16 (initial);_03/20/16;_03/21/16_
 Instrument ID numbers: GC4G
 Matrix/Level: Aqueous/low

| DATE | LAB FILE ID# | CRITERIA OUT RFs, %RSD, %D, r | COMPOUND | SAMPLES AFFECTED |
|----------|--------------|-------------------------------|--------------|--------------------------|
| 03/20/16 | cc1741-50 | -64.1 %/-31.8 | Methoxychlor | JC15796-1R; -2R; and -3R |
| | | | | |
| | | | | |

Note: Initial and continuing calibration meets the required criteria except for the cases described above. Results for Metoxychlor qualified as estimated (UJ) in affected samples. Closing calibration performed and within the required criteria.

Criteria

Are a five point calibration curve delivered with concentration levels as shown in Table 3 of SOP HW-36A, Revision 0, June, 2015? Yes? or No?

Actions

If the standard concentrations listed in Table 3 are not used, use professional judgment to evaluate the effect on the data

Criteria

Are RT Windows calculated correctly? Yes? or No?

Action

Recalculate the windows and use the corrected values for all evaluations.

Criteria

Are the Percent Relative Standard Deviation (%RSD) of the CFs for each of the single component target compounds less than or equal to 20.0%, except for alpha-BHC and delta-BHC?

Yes? or No?

DATA REVIEW WORKSHEETS

Are the %RSD of the CFs for alpha-BHC and delta-BHC less than or equal to 25.0%. Yes? or No?

Is the %RSD of the CFs for each of the Toxaphene peaks must be < 30% when 5-point ICAL is performed? Yes? or No?

Is the %RSD of the CFs for the two surrogates (tetrachloro-m-xylene and decachlorobiphenyl) less than or equal to 30.0%. Yes? or No?

Action

- a. If the %RSD criteria are not met, qualify detects as estimated (J) and use professional judgment to qualify non-detected target compounds.
- b. If the %RSD criteria are within allowable limits, no qualification of the data is necessary

Continuing Calibration Checks

Criteria

Is the continuing calibration standard analyzed at the acceptable time intervals? Yes? or No?

Action

- a. If more than 14 hours has elapsed from the injection of the instrument blank that begins an analytical sequence (opening CCV) and the injection of either a PEM or mid-point concentration of the Individual Standard Mixtures (A and B) or (C), qualify all data as unusable (R).
- b. If more than 12 hours has elapsed from the injection of the instrument blank that begins an analytical sequence (opening CCV) and the injection of the last sample or blank that is part of the same analytical sequence, qualify all data as unusable (R).
- c. If more than 72 hours has elapsed from the injection of the sample with a Toxaphene detection and the Toxaphene Calibration Verification Standard (CS3), qualify all data as unusable (R).

Criteria

Is the Percent Difference (%D) within $\pm 25.0\%$ for the PEM sample? Yes? or No?

Action

- a. Qualify associated detects as estimated (J) and non-detects as estimated (UJ).

Criteria

For the Calibration Verification Standard (CS3); is the Percent Difference (%D) within $\pm 25.0\%$? Yes? or No?

Action

Qualify associated detects as estimated (J) and non-detects as estimated (UJ).

DATA REVIEW WORKSHEETS

All criteria were met X
Criteria were not met
and/or see below

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is detected? Yes? or No?

Action

- a. Qualify detects for 4,4'-DDT; detects for 4,4'-DDD; and detects for 4,4'-DDE as estimated (J)
- b. Non-detected associated compounds are not qualified

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is not detected Yes? or No?

Action

- a. Qualify non-detects for 4,4'- DDT as unusable (R)
- b. Qualify detects for 4,4'-DDD as tentatively identified (NJ)
- c. Qualify detects for 4,4'-DDE as tentatively identified (NJ)

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is detected? Yes? or No?

Action

- a. Qualify detects for Endrin; detects for Endrin aldehyde; and detects for Endrin ketone as estimated (J)
- b. Non-detected associated compounds are not qualified

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is not detected Yes? or No?

Action

- a. Qualify non-detects for Endrin as unusable (R)
- b. Qualify detects for Endrin aldehyde as tentatively identified (NJ)
- c. Qualify detects for Endrin ketone as tentatively identified (NJ)

A separate worksheet should be filled for each initial curve

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

CRQL concentration N/A

Laboratory blanks

| DATE ANALYZED | LAB ID | LEVEL/ MATRIX | COMPOUND | CONCENTRATION UNITS |
|--|--------|---------------|----------|---------------------|
| <u>No target analytes detected in method blanks at a reporting limit of 0.01 and 0.001 ug/L.</u> | | | | |
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Field/Equipment/Trip blank

| DATE ANALYZED | LAB ID | LEVEL/ MATRIX | COMPOUND | CONCENTRATION UNITS |
|--|--------|---------------|----------|---------------------|
| <u>No target analyte detected in equipment blank. No field/trip blank analyzed with this data package.</u> | | | | |
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DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

The concentration of non-target compounds in all blanks must be less than or equal to 10 µg/L. The concentration of each target compound found in the method or field blanks must be less than its CRQL listed in the method.

Data concerning the field blanks are not evaluated as part of the CCS process. If field blanks are present, the data reviewer should evaluate this data in a similar fashion as the method blanks.

Specific actions are as follows:

Blank Actions for Pesticide Analyses

| Blank Type | Blank Result | Sample Result | Action for Samples |
|--|---------------------|----------------------------------|--|
| Method, Sulfur Cleanup, Instrument, Field, TCLP/SPLP | Detects | Not detected | No qualification required |
| | < CRQL | < CRQL | Report CRQL value with a U |
| | | ≥ CRQL | No qualification required |
| | > CRQL | < CRQL | Report CRQL value with a U |
| | | ≥ CRQL and ≤ blank concentration | Report blank value for sample concentration with a U |
| | | ≥ CRQL and > blank concentration | No qualification required |
| | = CRQL | ≤ CRQL | Report CRQL value with a U |
| | | > CRQL | No qualification required |
| | Gross contamination | Detects | Report blank value for sample concentration with a U |

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

| CONTAMINATION SOURCE/LEVEL | COMPOUND | CONC/UNITS | AL/UNITS | SQL | AFFECTED SAMPLES |
|-------------------------------|----------|------------|----------|-----|------------------|
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DATA REVIEW WORKSHEETS

All criteria were met _____
 Criteria were not met _____
 and/or see below X

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.

Matrix: Groundwater

| Lab Sample ID | Lab File ID | S1 a | S1 b | S2 a | S2 b |
|---------------------------|--------------------|--------|--------|--------|--------|
| JC15796-1R | 4G66284.D | 123 | 119 | 170* c | 156* c |
| JC15796-2R | 4G66285.D | 92 | 105 | 115 | 122* c |
| JC15796-3R | 4G66286.D | 110 | 116 | 84 | 89 |
| OP92024-BS1 | 4G66281.D | 107 | 112 | 129* d | 133* d |
| OP92024-MB1 | 4G66280.D | 139* d | 138* d | 158* d | 154* d |
| OP92024-MS | 4G66282.D | 106 | 103 | 147* c | 138* c |
| OP92024-MSD | 4G66283.D | 126* c | 123* c | 180* c | 167* c |
| Surrogate Compounds | Recovery Limits | | | | |
| S1 = Tetrachloro-m-xylene | 26-132% | | | | |
| S2 = Decachlorobiphenyl | 10-118% | | | | |

- (a) Recovery from GC signal #1
- (b) Recovery from GC signal #2
- (c) High percent recoveries and no positive found in the sample.
- (d) High percent recoveries and no positive found in the QC batch.
- (e) Outside the QC limits.

Note: No action taken, surrogate recoveries within the required criteria (> 30 % - < 150 %) in at least one of the columns.

Actions:

- a. For any surrogate recovery greater than 150%, qualify detected target compounds as biased high (J+).
- b. Do not qualify non-detected target compounds for surrogate recovery > 150 %.
- c. If both surrogate recoveries are greater than or equal to 30% and less than or equal to 150%, no qualification of the data is necessary.
- d. For any surrogate recovery greater than or equal to 10% and less than 30%, qualify detected target compounds as biased low (J-).
- e. For any surrogate recovery greater than or equal to 10% and less than 30%, qualify non-detected target compounds as approximated (UJ).

DATA REVIEW WORKSHEETS

f. If low surrogate recoveries are from sample dilution, professional judgment should be used to determine if the resulting data should be qualified. If sample dilution is not a factor:

i. Qualify detected target compounds as biased low (J-).

ii. Qualify non-detected target compounds as unusable (R).

g. If surrogate RTs in PEMs, Individual Standard Mixtures, samples, and blanks are outside of the RT Windows, the reviewer must use professional judgment to qualify data.

h. If surrogate RTs are within RT windows, no qualification of the data is necessary.

i. If the two surrogates were not added to all samples, MS/MSDs, standards, LCSs, and blanks, use professional judgment in qualifying data as missing surrogate analyte may not directly apply to target analytes.

Summary Surrogate Actions for Pesticide Analyses

| Criteria | Action* | |
|---|---------------------------|-------------------------------|
| | Detected Target Compounds | Non-detected Target Compounds |
| %R > 150% | J+ | No qualification |
| 30% < %R < 150% | No qualification | |
| 10% < %R < 30% | J- | UJ |
| %R < 10% (sample dilution not a factor) | J- | R |
| %R < 10% (sample dilution is a factor) | Use professional judgment | |
| RT out of RT window | Use professional judgment | |
| RT within RT window | No qualification | |

* Use professional judgment in qualifying data, as surrogate recovery problems may not directly apply to target analytes.

All criteria were met _____
 Criteria were not met _____
 and/or see below X

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

1. MS/MSD Recoveries and Precision Criteria

Data for MS and MSDs will not be present unless requested by the Region.

Notify the Contract Laboratory Program Project Officer (CLP PO) if a field blank was used for the MS and MSD, unless designated as such by the Region.

NOTE: For a Matrix Spike that does not meet criteria, apply the action to only the field sample used to prepare the Matrix Spike sample. If it is clearly stated in the data validation materials that the samples were taken through incremental sampling or some other method guaranteeing the homogeneity of the sample group, then the entire sample group may be qualified.

List the %Rs, RPD of the compounds which do not meet the criteria.

Sample ID: JC15796-1MS/-1MSD Matrix/Level: Groundwater/low

| MS OR MSD | COMPOUND | % R | RPD | QC LIMITS | ACTION |
|--------------------------|----------|-----|-----|-----------|--------|
| <u>See enclosed list</u> | | | | | |
| | | | | | |
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Action

No qualification of the data is necessary on MS and MSD data alone. However, using professional judgment, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data.

Note: No qualification of sample results, professional judgment.

A separate worksheet should be used for each MS/MSD pair.

DATA REVIEW WORKSHEET

JC15796R – MS/MSD

| Compound | JC15796-1R ug/l | Q | Spike ug/l | MS ug/l | MS % | Spike ug/l | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---------------------|--------------------|---|---------------|------------|---------|---------------|-------------|----------|-----|-------------------|
| Aldrin | ND | | 0.25 | 0.31 | 124 | 0.25 | 0.35 | 140* a | 12 | 37-159/40 |
| alpha-BHC | ND | | 0.25 | 0.34 | 136 | 0.25 | 0.39 | 156* a | 14 | 37-164/37 |
| delta-BHC | ND | | 0.25 | 0.34 | 136 | 0.25 | 0.39 | 156* a | 14 | 32-168/36 |
| gamma-BHC (Lindane) | ND | | 0.25 | 0.33 | 132 | 0.25 | 0.38 | 152* a | 14 | 44-160/37 |
| alpha-Chlordane | ND | | 0.25 | 0.38 | 152* a | 0.25 | 0.44 | 176* a | 15 | 38-160/35 |
| gamma-Chlordane | ND | | 0.25 | 0.40 | 160 | 0.25 | 0.45 | 180* a | 12 | 39-157/37 |
| Dieldrin | ND | | 0.25 | 0.35 | 140 | 0.25 | 0.41 | 164* a | 16 | 42-161/36 |
| 4,4'-DDD | ND | | 0.25 | 0.35 | 140 | 0.25 | 0.41 | 164* a | 16 | 40-161/36 |
| 4,4'-DDE | ND | | 0.25 | 0.35 | 140 | 0.25 | 0.41 | 164* a | 16 | 34-158/36 |
| 4,4'-DDT | ND | | 0.25 | 0.41 | 164* a | 0.25 | 0.48 | 192* a | 16 | 41-173/33 |
| Endrin | ND | | 0.25 | 0.40 | 164* a | 0.25 | 0.47 | 188* a | 16 | 44-166/35 |
| Endosulfan sulfate | ND | | 0.25 | 0.43 | 172* a | 0.25 | 0.50 | 200* a | 15 | 46-161/36 |
| Endrin aldehyde | ND | | 0.25 | 0.37 | 148* a | 0.25 | 0.43 | 172* a | 15 | 34-149/36 |
| Endrin ketone | ND | | 0.25 | 0.38 | 152* a | 0.25 | 0.44 | 176* a | 15 | 44-157/36 |
| Endosulfan-I | ND | | 0.25 | 0.35 | 140* a | 0.25 | 0.40 | 160* a | 13 | 43-154/35 |
| Endosulfan-II | ND | | 0.25 | 0.37 | 148* a | 0.25 | 0.43 | 172* a | 15 | 40-162/35 |
| Heptachlor | ND | | 0.25 | 0.32 | 128 | 0.25 | 0.37 | 148* a | 14 | 33-153/37 |
| Heptachlor epoxide | ND | | 0.25 | 0.36 | 144* a | 0.25 | 0.43 | 172* a | 18 | 45-154/37 |
| Methoxychlor | ND | | 0.25 | 0.49 | 196* a | 0.25 | 0.58 | 232* a | 17 | 48-169/32 |
| Toxaphene | ND | | | ND | | | ND | | nc | 50-150/30 |

| Surrogate Recoveries | MS | MSD | JC15796-1R | JC15796-1 | Limits |
|----------------------|---------|---------|------------|-----------|---------|
| Tetrachloro-m-xylene | 106% | 126%* a | 123% | 123% | 26-132% |
| Tetrachloro-m-xylene | 103% | 123%* a | 119% | 119% | 26-132% |
| Decachlorobiphenyl | 147%* a | 180%* a | 170%* b | 170%* b | 10-118% |
| Decachlorobiphenyl | 138%* a | 167%* a | 156%* b | 156%* b | 10-118% |

(a) Outside the QC limits.

(b) High percent recoveries and no positive found in the sample.

All criteria were met X
 Criteria were not met
 and/or see below

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

| LCS Spike Compound | Recovery Limits (%) |
|----------------------------------|---------------------|
| gamma-BHC | 50 – 120 |
| Heptachlor epoxide | 50 – 150 |
| Dieldrin | 30 – 130 |
| 4,4'-DDE | 50 – 150 |
| Endrin | 50 – 120 |
| Endosulfan sulfate | 50 – 120 |
| trans-Chlordane | 30 – 130 |
| Tetrachloro-m-xylene (surrogate) | 30 – 150 |
| Decachlorobiphenyl (surrogate) | 30 – 150 |

LCS concentrations: 0.25 ug/L

List the %R of compounds which do not meet the criteria

| LCS ID | COMPOUND | % R | QC LIMIT |
|--------|----------|-----|----------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Action

The following guidance is suggested for qualifying sample data for which the associated LCS does not meet the required criteria.

- If the LCS recovery exceeds the upper acceptance limit, qualify detected target compounds as estimated (J). Do not qualify non-detected target compounds.
- If the LCS recovery is less than the lower acceptance limit, qualify detected target compounds as estimated (J) and non-detects as unusable (R).
- Use professional judgment to qualify data for compounds other than those compounds that are included in the LCS.
- Use professional judgment to qualify non-LCS compounds. Take into account the compound class, compound recovery efficiency, analytical problems associated with each compound, and comparability in the performance of the LCS compound to the non-LCS compound.
- If the LCS recovery is within allowable limits, no qualification of the data is necessary.

DATA REVIEW WORKSHEETS

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? Yes or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

DATA REVIEW WORKSHEETS

All criteria were met _____
Criteria were not met _____
and/or see below N/A

FLORISIL CARTRIDGE PERFORMANCE CHECK

NOTE: Florisil cartridge cleanup is mandatory for all extracts.

Criteria

Is the Florisil cartridge performance check conducted at least once on each lot of cartridges used for sample cleanup or every 6 months, whichever is most frequent? Yes? or No? **N/A**

Criteria

Are the results for the Florisil Cartridge Performance Check solution included with the data package? Yes? or No? **N/A**

Note: If % criteria are not met, examine the raw data for the presence of polar interferences and use professional judgment in qualifying the data as follows:

Action:

- a. If the Percent Recovery is greater than 120% for any of the pesticide target compounds in the Florisil Cartridge Performance Check, qualify detected compounds as estimated (J). Do not qualify non-detected target compounds.
- b. If the Percent Recovery is greater than or equal to 80% and less than or equal to 120% for all the pesticide target compounds, no qualification of the data is necessary.
- c. If the Percent Recovery is greater than or equal to 10% and less than 80% for any of the pesticide target compounds in the Florisil Cartridge Performance Check, qualify detected target compounds as estimated (J) and non-detected target compounds as approximated (UJ).
- d. If the Percent Recovery is less than 10% for any of the pesticide target compounds in the Florisil Cartridge Performance Check, qualify detected compounds as estimated (J) and qualify non-detected target compounds as unusable (R).
- e. If the Percent Recovery of 2,4,5-trichlorophenol in the Florisil Cartridge Performance Check is greater than or equal to 5%, use professional judgment to qualify detected and non-detected target compounds, considering interference on the sample chromatogram.

Note: State in the Data Review Narrative potential effects on the sample data resulting from the Florisil Cartridge Performance Check analysis not yielding acceptable results.

Note: No information for florisil cartridge performance check included in data package. No qualification of the data performed, professional judgment.

All criteria were met _____
Criteria were not met _____
and/or see below ___N/A___

GEL PERMEATION CHROMATOGRAPHY (GPC) PERFORMANCE CHECK

NOTE: GPC cleanup is mandatory for all soil samples.

If GPC criteria are not met, examine the raw data for the presence of high molecular weight contaminants; examine subsequent sample data for unusual peaks; and use professional judgment in qualifying the data. Notify the Contract Laboratory Program Project Officer (CLP PO) if the laboratory chooses to analyze samples under unacceptable GPC criteria.

Action:

- a. If the Percent Recovery is less than 10% for the pesticide compounds and surrogates during the GPC calibration check, the non-detected target compounds may be suspect, qualify detected compounds as estimated (J).
- b. If the Percent Recovery is less than 10% for the pesticide compounds and surrogates during the GPC calibration check, qualify all non-detected target compounds as unusable (R).
- c. If the Percent Recovery is greater than or equal to 10% and is less than 80% for any of the pesticide target compounds in the GPC calibration, qualify detected target compounds as estimated (J) and non-detected target compounds as approximated (UJ).
- d. If the Percent Recovery is greater than or equal to 80% and less than or equal to 120% for all the pesticide target compounds, no qualification of the data is necessary.
- e. If high recoveries (i.e., greater than 120%) were obtained for the pesticides and surrogates during the GPC calibration check, qualify detected compounds as estimated (J). Do not qualify non-detected target compounds.

Note: State in the Data Review Narrative potential effects on the sample data resulting from the GPC cleanup analyses not yielding acceptable results.

Note: No information for performance of GPC cleanup included in data package. No qualification of the data performed, professional judgment.

All criteria were met X
Criteria were not met
and/or see below

TARGET COMPOUND IDENTIFICATION

Criteria:

1. Is Retention Times (RTs) of both of the surrogates and reported target compounds in each sample within the calculated RT Windows on both columns? Yes? or No?
2. Is the Tetrachloro-m-xylene (TCX) RT ± 0.05 minutes of the Mean RT (RT) determined from the initial calibration and Decachlorobiphenyl (DCB) within ± 0.10 minutes of the RT determined from the initial calibration? Yes? or No?
3. Is the Percent Difference (%D) for the detected mean concentrations of a pesticide target compound between the two Gas Chromatograph (GC) columns within the inclusive range of ± 25.0 %? Yes? or No?
4. When no analytes are identified in a sample; are the chromatograms from the analyses of the sample extract and the low-point standard of the initial calibration associated with those analyses on the same scaling factor? Yes? or No?
5. Does the chromatograms display the Single Component Pesticides (SCPs) detected in the sample and the largest peak of any multi-component analyte detected in the sample at less than full scale. Yes? or No?
6. If an extract is diluted; does the chromatogram display SCPs peaks between 10-100% of full scale, and multi-component analytes between 25-100% of full scale? Yes? or No? N/A
7. For any sample; does the baseline of the chromatogram return to below 50% of full scale before the elution time of alpha-BHC, and also return to below 25% of full scale after the elution time of alpha-BHC and before the elution time of DCB? Yes? or No?
8. If a chromatogram is replotted electronically to meet these requirements; is the scaling factor used displayed on the chromatogram, and both the initial chromatogram and the replotted chromatogram submitted in the data package. Yes? or No?

Action:

- a. If the qualitative criteria for both columns were not met, all target compounds that are reported as detected should be considered non-detected.
- b. Use professional judgment to assign an appropriate quantitation limit using the following guidance:
 - i. If the detected target compound peak was sufficiently outside the pesticide RT Window, the reported values may be a false positive and should be replaced with the sample Contract Required Quantitation Limits (CRQL) value.

DATA REVIEW WORKSHEETS

- ii. If the detected target compound peak poses an interference with potential detection of another target peak, the reported value should be considered and qualified as unusable (R).
- c. If the data reviewer identifies a peak in both GC column analyses that falls within the appropriate RT Windows, but was reported as a non-detect, the compound may be a false negative. Use professional judgment to decide if the compound should be included.

Note: State in the Data Review Narrative all conclusions made regarding target compound identification.

- d. If the Toxaphene peak RT windows determined from the calibration overlap with SCPs or chromatographic interferences, use professional judgment to qualify the data.
- e. If target compounds were detected on both GC columns, and the Percent Difference between the two results is greater than 25.0%, consider the potential for coelution and use professional judgment to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interfering compound is indicated, use professional judgment to determine how best to report, and if necessary, qualify the data according to these guidelines.
- f. If Toxaphene exhibits a marginal pattern-matching quality, use professional judgment to establish whether the differences are due to environmental "weathering" (i.e., degradation of the earlier eluting peaks relative to the later eluting peaks). If the presence of Toxaphene is strongly suggested, report results as presumptively present (N).

GAS CHROMATOGRAPH/MASS SPECTROMETER (GC/MS) CONFIRMATION

NOTE: This confirmation is not usually provided by the laboratory. In cases where it is provided, use professional judgment to determine if data qualified with "C" can be salvaged if it was previously qualified as unusable (R).

Action:

- a. If the quantitative criteria for both columns were met (≥ 5.0 ng/ μ L for SCPs and ≥ 125 ng/ μ L for Toxaphene), determine whether GC/MS confirmation was performed. If it was performed, qualify the data using the following guidance:
 - i. If GC/MS confirmation was not required because the quantitative criteria for both columns was not met, but it was still performed, use professional judgment when evaluating the data to decide whether the detect should be qualified with "C".
 - ii. If GC/MS confirmation was performed, but unsuccessful for a target compound detected by GC/ECD analysis, qualify those detects as "X".

DATA REVIEW WORKSHEETS

All criteria were met X
 Criteria were not met
 and/or see below

COMPOUND QUANTITATION AND REPORTED CONTRACT REQUIRED QUANTITATION LIMITS (CRQLS)

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

BLANK SPIKE beta-BHC RF = 0.596

$$\begin{aligned} [] &= (71879704)(50)/(215.9 \times 10^6)(0.596) \\ &= 27.93 \text{ ppb} \quad \text{Ok} \end{aligned}$$

Action:

- If sample quantitation is different from the reported value, qualify result as unusable (R).
- When a sample is analyzed at more than one dilution, the lowest CRQLs are used unless a QC exceedance dictates the use of the higher CRQLs from the diluted sample.
- Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original reporting form and substituting the data from the diluted sample.
- Results between the MDL and CRQL should be qualified as estimated (J).
- Results less than the MDL should be reported at the CRQL and qualified (U). MDLs themselves are not reported.
- For non-aqueous samples, if the percent moisture is less than 70.0%, no qualification of the data is necessary. If the percent moisture is greater than or equal to 70.0% and less than 90.0%, qualify detects as estimated (J) and non-detects as approximated (UJ). If the percent moisture is greater than or equal to 90.0%, qualify detects as estimated (J) and non-detects as unusable (R) (see Table).

Percent Moisture Actions for Pesticide Analysis for Non-Aqueous Samples

| Criteria | Action | |
|--------------------------|-------------------------------|-----------------------------------|
| | Detected Associated Compounds | Non-detected Associated Compounds |
| % Moisture < 70.0 | No qualification | |
| 70.0 < % Moisture < 90.0 | J | UJ |
| % Moisture > 90.0 | J | R |

DATA REVIEW WORKSHEETS

List samples which have $\leq 50\%$ solids

[illegible]

Note: If any discrepancies are found, the Region's designated representative may contact the laboratory to obtain additional information that could resolve any differences. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is the most accurate. Under these circumstances, the reviewer may determine that qualification of data is warranted. Note in the Data Review Narrative a description of the reasons for data qualification and the qualification that is applied to the data.

Dilution performed

[illegible]

DATA REVIEW WORKSHEETS

All criteria were met N/A
 Criteria were not met
 and/or see below

FIELD DUPLICATE PRECISION

NOTE: In the absence of QAPP guidance for validating data from field duplicates, the following action will be taken.

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples. Identify which samples within the data package are field duplicates. Estimate the relative percent difference (RPD) between the values for each compound. If large RPDs (> 50%) is observed, confirm identification of samples and note difference in the executive summary.

Sample IDs: -

Matrix: -

| COMPOUND | SQL ug/L | SAMPLE CONC. | DUPLICATE CONC. | RPD | ACTION |
|---|-------------|-----------------|--------------------|-----|--------|
| | | | | | |
| | | | | | |
| No field/laboratory data included with this data package. MS/MSD % recovery RPD used to assess precision. RPD within the required criteria of < 50 %. | | | | | |
| | | | | | |
| | | | | | |

Actions:

a. Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

b. If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:

- i. If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).
- ii. If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.
- iii. If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.
- iv. If both sample and duplicate results are not detected, no action is needed.

DATA REVIEW WORKSHEETS

OVERALL ASSESSMENT OF DATA

Action:

1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the Quality Control (QC) criteria previously discussed.
2. Write a brief narrative to give the user an indication of the analytical limitations of the data.

Note: The Contract Laboratory Program Project Officer (CLP PO) must be informed if any inconsistency of the data with the Sample Delivery Group (SDG) Narrative. If sufficient information on the intended use and required quality of the data is available, the reviewer should include their assessment of the usability of the data within the given context. This may be used as part of a formal Data Quality Assessment (DQA).

Overall assessment of the data: Results are valid; the data can be used for decision making purposes.